



**AALBORG UNIVERSITY**  
DENMARK

The Technical Faculty of IT and Design  
The Study Board of Planning, Geography and Surveying

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# **Curriculum for the Master's Programme in Urban, Energy and Environmental Planning**

Aalborg University  
September 2017

**Preface**

Pursuant to Act 261 of March 18, 2015 on Universities (the University Act) with subsequent changes, the following curriculum is established. The programme also follows the Joint Programme Regulations and the Examination Policies and Procedures for The Technical Faculty of IT and Design, The Faculty of Engineering and Science, and The Faculty of Medicine.

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## Chapter 1: Legal Basis of the Curriculum, etc.

### 1.1 Basis in Ministerial Orders

The Master's programme is organised in accordance with the Ministry of Higher Education and Science's Order no. 1328 of November 15, 2016 on Bachelor's and Master's Programmes at Universities (the Ministerial Order of the Study Programmes) and Ministerial Order no. 1062 of June 30, 2016 on University Examinations (the Examination Order). Further reference is made to Ministerial Order no. 111 of January 30, 2017 (the Admission Order) and Ministerial Order no. 114 of February 3, 2015 (the Grading Scale Order) with subsequent changes.

### 1.2 Faculty Affiliation

The master's programme falls under The Technical Faculty of IT and Design, Aalborg University.

### 1.3 Study Board Affiliation

The master's programme falls under the Study Board for Planning, Geography and Surveying, that falls under the School of Architecture, Design and Planning.

### 1.4 Censorship

The Master's program falls under the Danish "censorkorps for Ing"

## Chapter 2: Admission, Degree Designation, Programme Duration and Competence Profile

### 2.1 Admission

#### Applicants with a legal right of admission (retskrav):

Applicants with one of the following degrees are entitled to admission:

- Bachelor in Urban, Energy and Environmental Planning, AAU (Campus Aalborg)

#### Applicants without legal claim to admission:

Students with another Bachelor's degree may, upon application to the Board of Studies, be admitted after a specific academic assessment if the applicant is deemed to have comparable educational prerequisites. The University can stipulate requirements concerning conducting additional exams prior to the start of study.

### 2.2 Degree Designation in Danish and English

The Master's program entitles the graduate to the designation *civilingeniør, cand.polyt.* (candidatus/candidata polytechnices) i By-, Energi- og Miljøplanlægning med specialisering i:

- Byplanlægning
- Miljøledelse og bæredygtighed
- Energiplanlægning, *eller*
- Byer og bæredygtighed

The English designation is: Master of Science (MSc) in Engineering (Urban, Energy and Environmental Planning) with specialisation in:

- Urban Planning and Management
- Sustainable Energy Planning and Management
- Environmental Management and Sustainability Science, *or*
- Cities and Sustainability

### **2.3 The Programme's Specification in ECTS Credits**

The master's programme is a 2-year research-based full-time study programme. The programme is set to 120 ECTS credits.

### **2.4 Competence Profile on the Diploma**

The following competence profile will appear on the diploma:

#### **A Candidatus graduate has the following competency profile:**

A Candidatus graduate has competencies that have been acquired via a course of study that has taken place in a research environment.

A Candidatus graduate is qualified for employment on the labour market on the basis of his or her academic discipline as well as for further research (PhD programmes). A Candidatus graduate has, compared to a Bachelor, developed his or her academic knowledge and independence so as to be able to apply scientific theory and method on an independent basis within both an academic and a professional context.

### **2.5 Competence Profile of the Programme**

#### **2.5.1 Urban Planning and Management (UPM)**

For the specialisation in Urban Planning and Management, the candidate acquires, in addition to the competence profile of the diploma, the following:

##### Knowledge

- Has basic knowledge of the implications of research ethics
- Has understanding of theories of science, research design and research methods relevant for conducting research within the field of planning
- Has thorough knowledge of theories and methods in planning, administration and/or management within the public and private sector
- Basic understanding of the technical, structural and social conditions connected with the development and infrastructures of towns and regions
- Understanding of the complex processes taking place in connection with the preparation and implementation of strategies and plans, where both public and private interests prevail
- Possesses insight into and understanding of the social-technical conditions under which strategies, plans and projects are implemented.
- Knowledge and understanding of the history of modern urban planning
- Knowledge and understanding of the complexities of planning for sustainable urban development
- Knowledge and understanding of the scientific value foundations of different urban planning theories
- Knowledge of planning processes and an understanding of their relation to politics and power in the field of urban planning
- Knowledge and understanding of the role of the planner in managing power relations

##### Skills

- Can identify relevant research problems within the field of planning
- Can design a research project and use relevant research methods in order to analyse a chosen problem
- Can analyse the technical and social context of strategies and plans
- Can analyse and prepare strategies, plans and projects at different levels

- Can assess if strategies, plans, projects or infrastructure systems are expedient and feasible in technical, economic, environmental, and social respects
- Can involve the public and relevant actors at all levels in planning processes
- Can reflect on ethical matters in connection with professional practice
- Can impart research-based knowledge within the field of planning and discuss professional and scientific problems with both colleagues and non-specialists.
- Can analyse and evaluate urban policies and plans in relation to their immediate as well as long-term contribution to sustainable urban development
- Can use urban theories to analyse historical and contemporary planning practices and identify contemporary and potential planning challenges
- Can prepare concepts, proposals and solutions to guide future urban planning objectives
- Can analyse and evaluate a planning process, and critically assess power dynamics in the practices of planning
- Can make use of relevant theories, concepts and methods to analyse the practice of planning and critically evaluate the need for the planner to intervene in different contexts

#### Competencies

- Can act as part of public organisations as well as private firms, including NGOs
- Can understand and on a scientific basis reflect on the knowledge and problems of the field of planning and in this relation identify important social problems
- Can assess the expediency of different theories and methods for independent analysis and professional problem solution
- Can formulate and analyse essential problems independently, systematically and critically by using relevant scientific methods
- Can act as part of interdisciplinary teams within the field of planning, working with the preparation and implementation of plans and strategies in Danish or international contexts
- Can develop proposals for management instruments to secure the implementation of strategies, plans and projects
- Can use the acquired knowledge to provide and initiate open and democratic planning processes
- Can participate in research within the field of planning and in this way contribute to the development of the profession
- Can independently develop own competencies and specialisation
- Can independently and critically manage work and development situations that are complex, unpredictable and require new solutions
- Can independently conduct research on the historical and contemporary development of cities and identify contemporary planning problems
- Can carry out focused, critical and well-informed research to support the planning for sustainable and liveable cities
- Can independently and critically manage planning processes that are influenced by power dynamics

#### **2.5.2 Sustainable Energy Planning and Management (SEPM)**

For the specialisation in Sustainable Energy Planning and Management, the candidate acquires, in addition to the competence profile of the diploma, the following:

## Knowledge

- Has understanding of theories of science, research design and research methods relevant for conducting research within the field of planning
- Basic understanding of the technical, structural and social conditions connected with the development and infrastructures of towns and regions
- Possesses insight into and understanding of the social-technical conditions under which strategies, plans and projects are implemented
- Knowledge and understanding of energy problems and energy planning at the level of companies and organisations, as well as on a societal level
- Knowledge and understanding of institutional and organisational conditions and public regulation related to energy planning in different national and cultural contexts
- Knowledge and understanding of theories, evaluation methods and tools in relation to the analysis of energy problems
- Knowledge and understanding of energy systems and energy plants, including technical and economic energy system analysis
- Knowledge and understanding of international energy policies, including their origin and historical context, their implementation effects and connection with decision processes

## Skills

- Can identify relevant research problems within the field of planning
- Can design a research project and use relevant research methods in order to analyse a chosen problem
- Can analyse the technical and social context of strategies and plans
- Can analyse and prepare strategies, plans and projects at different levels
- Can assess if strategies, plans, projects or infrastructure systems are expedient and feasible in technical, economic, environmental, and social respects
- Can impart research-based knowledge within the field of planning and discuss professional and scientific problems with both colleagues and non-specialists
- Can critically analyse energy-related problems, and understand, use and analyse evaluation methods and tools for socio-economic impact analyses
- Can understand and reflect on connections between institutions, public regulation and organisations, their dynamics as well as their interaction with the surrounding society
- Can simulate the operation of energy systems with multiple dependent energy sources, energy conversion technologies and end-use energy demands
- Can formulate and analyse proposals for strategies within energy planning, which are based on an analysis of the societal conditions
- Can critically analyse sustainable energy-related problems in relation to national and international energy policies
- Can analyse and assess energy systems from technical, economic and environmental criteria

## Competencies

- Can act as part of public organisations as well as private firms, including NGOs
- Can understand and on a scientific basis reflect on the knowledge and problems of the field of planning and in this relation identify important social problems

- Can assess the expediency of different theories and methods for independent analysis and professional problem solution
- Can formulate and analyse essential problems independently, systematically and critically by using relevant scientific methods
- Can act as part of interdisciplinary teams within the field of planning, working with the preparation and implementation of plans and strategies in Danish or international contexts
- Can develop proposals for management instruments to secure the implementation of strategies, plans and projects
- Can use the acquired knowledge to provide and initiate open and democratic planning processes
- Can participate in research within the field of planning and in this way contribute to the development of the profession
- Can independently develop own competencies and specialisation
- Can independently initiate and participate in interdisciplinary energy planning on a company, organisational level or societal level
- Can reflect critically on project-related choices of tools and their significance for analyses and results
- Can develop adequate theoretical approaches linked to specific problems/challenges and independently collect the relevant data and assess the quality and reliability of these data
- Can independently start and participate in interdisciplinary planning tasks and cooperation across societal levels, nationalities and cultures
- Can prepare proposals for technical system design and combine it with the design of public regulation and strategies in energy planning

### **2.5.3 Environmental Management and Sustainability Science (EMSS)**

For the specialisation in Environmental Management and Sustainability Science, the candidate acquires, in addition to the competence profile of the diploma, the following:

#### Knowledge

- Has basic knowledge of the implications of research ethics
- Has understanding of theories of science, research design and research methods relevant for conducting research within the field of environmental planning and sustainability science
- Has thorough knowledge of theories and methods in planning, administration and/or management within the public and private sector
- Basic understanding of the technical, structural and social conditions connected with the development and infrastructures of towns and regions
- Understanding of the complex processes taking place in connection with the preparation and implementation of strategies and plans, where both public and private interests prevail
- Possesses insight into and understanding of the social-technical conditions under which strategies, plans and projects are implemented
- Understanding of measurement and indicator techniques for specific resource types
- Knowledge and understanding of environmental challenges at the level of companies and organisations, as well as on a societal level
- Knowledge and understanding of institutional and organisational conditions and public regulation related to environmental planning in different national and cultural contexts



- Knowledge and understanding of how impact assessment, tools and evaluation methods connects to societal decision-making on e.g. large infrastructures, technologies or spatial developments

## Skills

- Can identify relevant research problems within the field of planning
- Can design a research project and use relevant research methods in order to analyse a chosen problem
- Can analyse the technical and social context of strategies and plans
- Can analyse and prepare strategies, plans and projects at different levels
- Can assess if strategies, plans, projects or infrastructure systems are expedient and feasible in technical, economic, environmental, and social respects
- Can involve the public and relevant actors at all levels in planning processes
- Can reflect on ethical matters in connection with professional practice
- Can impart research-based knowledge within the field of planning and discuss professional and scientific problems with both colleagues and non-specialists.
- Can describe and explain the technologies used to extract and use specific natural resources and can discuss possible innovations and their applicability depending on framework conditions
- Can describe existing natural resource management approaches that are applied to use, protect and/or restore specific natural resources
- Can calculate, assess and interpret total impacts of product and service systems using multiple methods
- Can communicate results of assessments to both other peers and non-specialists
- Can critically analyse environment and sustainability problems, and understand, use and analyse evaluation methods and tools for impact analyses
- Can understand and reflect on connections between institutions, public regulation and organisations, their dynamics as well as their interaction with the surrounding society
- Can critically analyse sustainability issues in relation to national and international policies

## Competencies

- Can act as part of public organisations as well as private firms, including NGOs
- Can understand and on a scientific basis reflect on the knowledge and problems of the field of planning and in this relation identify important social problems
- Can assess the expediency of different theories and methods for independent analysis and professional problem solution
- Can formulate and analyse essential problems independently, systematically and critically by using relevant scientific methods
- Can act as part of interdisciplinary teams within the field of planning, working with the preparation and implementation of plans and strategies in Danish or international contexts
- Can develop proposals for management instruments to secure the implementation of strategies, plans and projects

- Can use the acquired knowledge to provide and initiate open and democratic planning processes
- Can participate in research within the field of planning and in this way contribute to the development of the profession
- Can independently develop own competencies and specialisation
- Can formulate and analyse essential problems independently, systematically and critically by using relevant scientific methods
- Can act as part of interdisciplinary teams in Danish or international contexts
- Can reflect critically on project-related choices of tools and their significance for analyses and results
- Can independently start and participate in interdisciplinary planning tasks and cooperation across societal levels, nationalities and cultures
- Can prepare proposals for technical system design and combine it with the design of public regulation and strategies

#### **2.5.4 Cities and Sustainability (CiSu)**

For the specialisation in Cities and Sustainability, the candidate acquires, in addition to the competence profile of the diploma, the following:

##### Knowledge

- Has profound knowledge within one or more of the following subject areas that, in selected topics, are based on the highest international research
  - Sustainable Development
  - Urban Planning
  - Air Pollution
  - Climate Change
  - Ecological Economics
  - Environmental Protection and Management
  - Industrial Ecology
  - Material and energy flow analysis
  - Sustainability Assessment
  - Waste & Resource Management
  - Water, Energy and Food Nexus
- Has basic knowledge of the implications of research ethics
- Has profound knowledge of relevant national and international research work
- Has profound knowledge of theories and methods in planning, administration and/or management within the public and private sector
- Possesses specialist understanding in continuation of the previous degree/or new professional competence in addition to the previous degree
- Has thorough understanding of the technical, structural and social conditions connected with the development and infrastructures of cities
- Possesses insights into and understanding of the socio-technical and socio-economic conditions under which urban environmental and sustainability policies, strategies, plans, technologies and projects are implemented

##### Skills

- Can handle the methods and tools of contemporary urban development as well as general skills connected with occupation within the field
- Can assess and choose among the theories, methods, tools and general skills of urban development, and on a scientific basis draw up new models of analysis and solution

- Can analyse the technical, economic and social context of which strategies and plans within sustainable urban development are a part
- Can analyse and prepare strategies, plans and projects at different levels
- Can assess if strategies, plans, projects or infrastructure systems are expedient and feasible in technical, economic, environmental, and social respects
- Can involve the public and relevant actors at all levels
- Can reflect on ethical matters in connection with professional practice
- Can independently make and motivate professionally related decisions and when necessary carry out investigations procuring a sufficient basis of decision
- Can impart research-based knowledge within the field of sustainable urban development and discuss professional and scientific problems with both colleagues and non-specialists.

### Competencies

- Can act as part of public, private, non-governmental and knowledge organisations
- Can understand and on a scientific basis reflect on the knowledge and problems of the field of sustainability and urban development, and in this relation identify important socio-technical and socio-economic problems
- Can formulate and analyse essential problems independently, systematically and critically by using relevant scientific methods
- Can assess the expediency of different theories and methods for independent analysis and professional problem solution
- Can act as part of interdisciplinary teams within the field of urban development, working with the preparation and implementation of policies, plans and strategies in national and/or international contexts
- Can participate in research within the field of sustainable urban development and in this way contribute to the enhancement of the profession
- Can independently take responsibility for and develop own competencies and specialisation

## Chapter 3: Content and Organisation of the Programme

The programme is modular and organised as a problem-based study. A module is a discipline or a group of disciplines the objective of which is to give the student an entirety of professional qualifications within a specified time frame indicated in ECTS credits and which is finished with one or more examinations within certain examination periods. The examination is indicated and limited in the curriculum.

The programme builds on a combination of professional, problem-based and interdisciplinary approaches and is organized on the basis of the following work and evaluation forms combining skills and professional reflection:

- lectures
- class teaching
- project work
- workshops
- assignments (individually and in groups)
- teacher feedback

- reflection
- portfolio work
- Etc.

### 3.1 Overview of the Programme

The table below presents an overview of project modules and course modules at the four semesters of the master's programme. For the first and second semesters the four specialisations are indicated separately.

All modules are assessed through individual grading according to the 7-point scale or pass/fail (P/F). All modules are assessed by external examination (external grading) (E) or internal examination (internal grading) (I) or by assessment by the supervisor only.

UPM specialisation	Semester	Module	ECTS	Assessment 7-point P/F	Exam Internal/ external
C*	1	Theories of Science and Research Designs	5	P/F	I
P	1	The Complex City	15	7-point	I
C	1	Planning History and Urban Theory	5	7-point	I
C**	1	Sustainable Urban Planning	5	P/F	I
C*	2	The Socio-Technical Context of Planning	5	7-point	I
P	2	Power in Planning	15	7-point	E
C	2	The Deliberative Planner	5	P/F	I
C	2	Planning Theory	5	7-point	I
P	3	Elective module: Professional Development	30	7-point	I
P	3	Elective module: Long Master's Thesis	+30	7-point	E
P	4	Master's Thesis	30/60	7-point	E
Totally			120		

SEPM specialisation	Semester	Module	ECTS	Assessment 7-point P/F	Exam Internal/ external
C*	1	Theories of Science and Research Designs	5	P/F	I
P	1	Sustainable Energy Planning in a Technical and Business Economic Perspective	15	7-point	I
C	1	Energy Project Evaluation	5	7-point	I
C	1	Energy System Analysis 1	5	P/F	I
C*	2	The Socio-Technical Context of Planning	5	7-point	I
P	2	Sustainable Energy Planning in an Institutional and Societal Perspective	15	7-point	E
C	2	Sustainable Energy Policies	5	P/F	I
C	2	Energy System Analysis 2	5	P/F	I
P	3	Elective module: Professional Development	30	7-point	I
P	3	Elective module: Long Master's Thesis	+30	7-point	E
P	4	Master's Thesis	30/60	7-point	E
Totally			120		

EMSS specialisation	Semester	Module	ECTS	Assessment 7-point P/F	Exam Internal/ external
C*	1	Theories of Science and Research Designs	5	P/F	I
P	1	Corporate Sustainability Management	15	7-point	I
C	1	Sustainable Consumption and Production	5	P/F	I
C	1	Sustainable Products and Services	5	7-point	I
C*	2	The Socio-Technical Context of Planning	5	7-point	I
P	2	Sustainability Management in a Societal and Institutional Perspective	15	7-point	E
C	2	Natural Resource Management	5	P/F	I
C****	2	Sustainability Assessment and Societal Decision Processes	5	7-point	I
P	3	Elective module: Professional Development	30	7-point	I
P	3	Elective module: Long Master's Thesis	+30	7-point	E
P	4	Master's Thesis	30/60	7-point	E
Totally			120		

CiSu specialisation	Semester	Module	ECTS	Assessment 7-point P/F	Exam Internal/ external
C*	1	Theories of Science and Research Designs	5	P/F	I
C**	1	Sustainable Urban Planning	5	P/F	I
P	1	Urban Transformations and Sustainable Engineering	15	7-point	I
C***	1	Climate and Hydrology of the Dense City	5	7-point	I
C*	2	The Socio-Technical Context of Planning	5	7-point	I
C****	2	Sustainability Assessment and Societal Decision Processes	5	7-point	I
P	2	Designing Smarter Cities	15	7-point	E
C*****	2	Theories of the Network City and its Technologies	5	7-point	I
P	3	Elective module: Professional Development	30	7-point	I
P	3	Elective module: Long Master's Thesis	+30	7-point	E
P	4	Master's Thesis	30/60	7-point	E
Totally			120		

\* = Common course for all four specialisations of Urban, Energy and Environmental Planning.

\*\* = This is a common course between CiSu and UPM.

\*\*\* = This is a common course between CiSu and the master's programme in Urban Design (specialisation in Urban Architecture).

\*\*\*\* = This is a common course between CiSu and EMSS.

\*\*\*\*\* = This is a common course between CiSu and the master's programme in Urban Design (specialisation in Mobilities and Urban Studies).

At the 3<sup>rd</sup> semester the student can choose freely between carrying through the semester as **1)** Project semester – with or without integrated, project-oriented internship **2)** Another UEEP 1<sup>st</sup> semester or 1<sup>st</sup> semester Geography **3)** International or national credit **4)** Extended master's thesis.

The programme is taught in English.

### 3.2 Module Descriptions

**1<sup>st</sup> Semester:**            **Common Course Module (Urban, Energy and Environmental Planning)**

**Title:**                      **Theories of Science and Research Designs (Videnskabsteori og forskningsdesign)**

**Objectives:**              Students completing the module, acquire the following:

Knowledge:

- Understanding of the history and theoretical framework of theories of science at a graduate level
- Understanding of the relation between theories of science, research design and research methods at a graduate level
- Understanding of the contents and interrelation of the positions of theories of science and capability of relating critically to them
- Thorough knowledge of the relation to theories of science and research designs of own professional fields

Skills:

- Can use the basic complex of problems of theories of science in relation to assessment of courses and references in projects at a graduate level
- Can independently assess the value and reliability of own science production in relation to scientific basic complexes of problems
- Can independently assess the value and reliability of others' research design and methodologies
- Can use theories of science, research design and research methods within own fields at a graduate level
- Can impart knowledge of theories of science and research designs to specialists as well as non-specialists

Competencies:

- Can reflect critically on project-related choices of value bases, theories of science and methods
- Can reflect critically on choices of qualitative and quantitative research methods
- Can take responsibility for continuous professional development through acquisition of new knowledge of the development and renewal of theories of science and research designs.

**Teaching:**                Lectures, workshops, seminars, assignments, etc.

**Examination:**            Individual oral or written examination, internal grading, pass/fail.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **1<sup>st</sup> Semester: Project Module (Urban Planning and Management)**

**Title:**                   **The Complex City (Den komplekse by)**

**Objectives:**           Students completing the module acquire the following:

### Knowledge:

- Knowledge and understanding of direct and indirect consequences of urban development
- Knowledge and understanding of the complexities of planning for sustainable urban development
- Knowledge of one or more fields within urban theory which is based on international academic research
- Knowledge of theories of science and research methods relevant for conducting research within the field of urban planning
- Knowledge of the fundamental principles of Problem Based Learning (PBL) as implemented in the Aalborg PBL model at The Technical Faculty of IT and Design
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### Skills:

- Can identify a relevant research problem within the field of urban planning
- Can design a research project and use relevant research methods in order to analyse the chosen problem
- Can justify and substantiate the relevance of the chosen research problem based on urban planning theories on an international academic level
- Can analyse and evaluate urban policies and plans in relation to their immediate as well as long-term contribution to sustainable urban development
- Can propose an alternative urban policy and evaluate the potential consequences of this policy
- Can in relation to urban development impart research-based knowledge and discuss professional and scientific problems with both colleagues and non-specialists
- Can structure project management activities based on a well-formulated problem formulation

### Competencies:

- Can independently and critically manage work and development situations that are complex, unpredictable and require new solutions
- Can independently start and carry out subject specific and interdisciplinary cooperation and take a professional responsibility
- Can independently take the responsibility for own professional development and specialisation
- Can reflect on, plan and manage a study project in a PBL learning environment

**Teaching:**               Problem-based project work in groups

**Examination:**       Individual oral examination based on the project report, internal grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **1<sup>st</sup> Semester: Course Module 1 (Urban Planning and Management)**

**Title:** Planning History and Urban Theory (Planlægningshistorie og byteori)

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Knowledge and understanding of the history of modern urban planning
- Knowledge and understanding of the scientific value foundations of different urban theories
- Knowledge and understanding of urban theory in different historical and geographical contexts of urban planning
- Understanding of one or more contemporary urban theories on an international academic level
- Knowledge and understanding of the global driving forces shaping contemporary urbanisation in different international contexts

### Skills:

- Can critically examine urban problems and challenges from a historical approach
- Can use urban theories to analyse historical and contemporary planning practices and identify contemporary and potential planning challenges

### Competencies:

- Can independently conduct research on the historical and contemporary development of cities and identify contemporary planning problems
- Can independently and critically apply urban theory to planning situations that are complex, unpredictable and require new solutions

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.



## 1<sup>st</sup> Semester: Course Module 2 (Urban Planning and Management and Cities & Sustainability)

Title: **Sustainable Urban Planning (Bæredygtig byplanlægning)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Understanding of the complexities of contemporary urban planning in relation to challenges and possibilities such as sustainability, resilience and liveability
- Understanding of radical changes that can constitute future directions for international urban development
- Knowledge and understanding of different concepts, analytical methods and tools for assessing the qualities of planning documents

### Skills:

- Can critically use relevant theories, concepts, analytical methods and tools for assessing the qualities of planning documents and visions
- Can analyse urban problems taking into consideration economic, environmental and social conditions
- Can prepare concepts, proposals and solutions to guide future urban planning objectives
- Can communicate research-based knowledge and scientific problems and facilitate possible future planning solutions with both professionals (from a variety of fields) and non-specialists

### Competencies:

- Can independently use relevant theories, concepts and methods to identify challenges and possibilities in relation to sustainable urban planning
- Can engage in interdisciplinary cooperation with other experts and the public in planning urban solutions and proposals and take a professional responsibility in relation to guiding future action
- Can carry out focused, critical and well-informed research to support the planning for sustainable and liveable cities

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, pass/fail.

Assessment criteria: Stated in the Joint Programme Regulations.

## 1<sup>st</sup> Semester: Project Module (Sustainable Energy Planning and Management)

Title: **Sustainable Energy Planning in a Technical and Business Economic Perspective (Bæredygtig energiplanlægning i et teknisk og virksomhedsøkonomisk perspektiv)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Thorough knowledge and understanding of the framework conditions, challenges and roles in relation to energy problems of companies and organisations, including an ability to use tools and methods to analyse these
- Can understand and on a scientific basis reflect on energy planning on a business economic level and are able to identify scientific problems in this connection
- Knowledge of theories of science and research methods relevant for analysis of energy planning and ability of reflecting on them
- Knowledge of the fundamental principles of Problem Based Learning (PBL) as implemented in the Aalborg PBL model at The Technical Faculty of IT and Design

### Skills:

- Can identify, analyse and assess the project-relevant energy problems and consequences
- Can prepare proposals for a specific energy improvement proposal in relation to the realisation of the solution in a relevant company or organisation and seen in relation to relevant actors
- Can understand, use and critically reflect on relevant quantitative and qualitative economic, sociological, environmental and/or engineering methods of analysis and uncover the interests connected to them
- Can independently collect relevant data in relation to specific problems/challenges as well as assess the quality and reliability of these data
- Can motivate, argue and communicate the general structure and methods of the project in a scientific-theoretical context
- Can relate critically to sources and use accurate source references
- Can communicate the result of the project work to selected target groups
- Can structure project management activities based on a well-formulated problem formulation

### Competencies:

- Can structure and handle the complex composition of specific challenges on an organisation/company level in the study and project work
- Can combine and compose the use of relevant theories, understandings, methods analyses so that they form a synthesis towards the preparation of specific strategies and plans directed towards organisation or company-level possibilities of working with sustainable energy solutions
- Can independently initiate and participate in interdisciplinary energy planning on a company or organisational level
- Can reflect on, plan and manage a study project in a PBL learning environment

Teaching: Problem-based project work in groups.

Examination: Individual oral examination based on the project report, internal grading, 7-point scale.

Assessment criteria: Stated in the Joint Programme Regulations.

## 1<sup>st</sup> Semester: Course Module 1 (Sustainable Energy Planning and Management)

Title: **Energy Project Evaluation (Energiprojektevaluering)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Thorough knowledge of energy-related environmental, economic and socially related problems
- Knowledge of business- and socio-economic impact analyses as well as the interaction with implementation and public regulation
- Knowledge of institutional and organisational conditions related to energy planning
- Knowledge of theories, evaluation methods and tools in relation to energy planning including environmental, economic, institutional and organisational problems

### Skills:

- Can critically analyse energy-related problems
- Can understand, use and analyse evaluation methods and tools for socio-economic impact analyses
- Can understand and reflect on connections between institutions and organisations, their dynamics as well as their interaction with the surrounding world
- Can understand energy-related environmental problems and analyse these
- Can assess application fields for evaluation methods and tools, including critically assess results and conclusions on the basis of different methods and tools
- Can understand and reflect on theories, evaluation methods and analysis tools within the relevant fields.

### Competencies:

- Can reflect critically on project-related choices of tools and their significance for analyses and results
- Can adjust and adapt different tools for the topical challenges and needs

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, 7-point-scale.

Assessment criteria: Stated in the Joint Programme Regulations.

## **1<sup>st</sup> Semester Course Module 2 (Sustainable Energy Planning and Management)**

**Title: Energy System Analysis 1 (Energisystemanalyse 1)**

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Thorough knowledge of the energy system from energy supply via conversion to demand including fuels, renewable energy plants, conversion technologies, demand and savings
- Knowledge of the localisation aspects of energy systems
- Knowledge of the operation of energy plants as well as evaluation methods and analysis tools for energy plants, including technical limitation, optimizing possibilities, environmental and economic consequences, involvement of externalities
- Knowledge of market conditions for energy plants

### Skills:

- Can simulate the operation of energy systems with multiple dependent energy sources, energy conversion technologies and end-use energy demands.
- Can optimise energy system operation against external energy markets
- Can assess application fields for tools and methods, including critically assess results and conclusions on the basis of different tools and methods
- Can understand and reflect on theories, methods and analysis tools within the relevant areas

### Competencies:

- Can reflect critically on project-related choices of simulations and tools and their significance for analyses and results
- Can adjust and adapt different simulations and tools for the topical challenges and needs

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, pass/fail.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **1<sup>st</sup> Semester: Project Module (Environmental Management and Sustainability Science)**

**Title:** Corporate Sustainability Management (Organisationsrelateret bæredygtighedsledelse)

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Have thorough knowledge and understanding of the framework conditions, challenges and roles of enterprises and organisations in relation to sustainable development, including also the tools and systems which are relevant on an organisation level
- Knowledge of the fundamental principles of Problem Based Learning (PBL) as implemented in the Aalborg PBL model at The Technical Faculty of IT and Design

### Skills:

- Can identify, analyse and assess project-relevant sustainability problems and consequences
- Can understand, use and critically reflect on relevant quantitative as well as qualitative methods of analysis
- Can independently procure relevant data in relation to the challenge and problem of the project and assess the quality and reliability of these data
- Can motivate, argue and communicate the general structure and methods of the project. Must also be able to reflect critically on sources and use accurate source referencing
- Can use project-relevant theories to structure plans and action for improved sustainability at organisation level
- Can structure project management activities based on a well-formulated problem formulation

### Competencies:

- Can structure and handle the complex combinations of specific challenges at an organisation level (eg. business level)
- Can combine and compose the use of relevant theories, understandings, methods and models so that they form an analytical framework to be used when preparing specific strategies and plans adapted to the possibilities of the enterprise(s) or organisation(s).
- Can independently start and participate in interdisciplinary sustainability planning tasks and co-operation on an organisation level
- Can reflect on, plan and manage a study project in a PBL learning environment

**Teaching:** Problem-based project work in groups.

**Examination:** Individual oral examination based on the project report. Internal grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## 1<sup>st</sup> Semester: Course Module 1 (Environmental Management and Sustainability Science)

Title: **Sustainable Consumption and Production (Bæredygtigt forbrug og produktion)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Can define key concepts within sustainable consumption and production and explain their interrelationships
- Understanding of the basic characteristics and dynamics of product chains and networks

### Skills:

- Can summarise the range of local, regional and global initiatives that support implementation of sustainable consumption and production actions
- Can identify and classify case specific stakeholders and prescribe how to handle these
- Can identify relevant reference standards and legislative documents from international sources
- Can set policies and define objectives, targets and key performance indicators for specific organisations working for sustainability
- Can link sustainability policies at an organisation level (micro level) to internationally negotiated goals (macro or meta level) and assess their relevance
- Can apply relevant theories to analyse the existing innovation complex of specific cases
- Can apply relevant innovation strategies that involve different stakeholders (eg. co-creation, co-production etc.)
- Can apply relevant theories to analyse the relevance of different value creation models in specific cases to arrive at implementable, real-life action plans
- Can identify and critically reflect on the benefits and drawbacks as well as possible inherent contradictions of models, concepts and theories when applied to a specific issue

### Competencies:

- Can interpret results and assess the applicability of certain tools in specific circumstances
- Can discuss opportunities and challenges for advancing sustainable consumption in specific contexts
- Can initiate transformation and co-operation processes among industries, individuals and social groups to become actors in a development process

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, pass/fail.

Assessment criteria: Stated in the Joint Programme Regulations.

## 1<sup>st</sup> Semester: Course Module 2 (Environmental Management and Sustainability Science)

Title: **Sustainable Products and Services (Bæredygtige produkter og serviceydelser)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Knowledge of the scientific theoretical and methodological basis of key analytical tools for environmental assessment of products
- Have thorough knowledge of key concepts in eco-design of products
- Knowledge of creativity in the eco-design process
- Basic knowledge of consumption practices and consumption volumes
- Knowledge of regulatory aspects for the development of sustainable products

### Skills:

- Can plan and carry out independently the quantitative life-cycle based environmental assessment of a given product
- Can shift from qualitative to quantitative representations of product systems, select and gather relevant data and information needed to calculate impact estimates for the product
- Can think creatively and to include elements of critical reflection to the eco-design of a product
- Can analyse and describe the eco-design process by using relevant theories and empirical investigations
- Can organise eco-design procedures for a specific product

### Competencies:

- Can creatively develop solutions for the ecodesign of products that take into account the products' life cycle perspective
- Can interpret quantitative and qualitative environmental assessment results and use them in a product improvement and design context

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, 7-point scale.

Assessment criteria: Stated in the Joint Programme Regulations.



## 1<sup>st</sup> Semester: Project Module (Cities and Sustainability)

Title: **Urban Transformations and Sustainable Engineering (Urbane transformationer og bæredygtighed)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Understanding of the dynamics of the urban climate and its effects on the built environment
- Knowledge of environmentally and socially sustainable techniques for densifying the urban environment
- Knowledge of potential resources in the contemporary built environment as a catalyst to finding sustainable engineering and design solutions
- Knowledge of synergies and conflicts in climate change planning
- Knowledge of the fundamental principles of Problem Based Learning (PBL) as implemented in the Aalborg PBL model at The Technical Faculty of IT and Design

### Skills:

- Can analyse and conceptualise complex urban projects and environments from a number of perspectives related to the 'compact city', e.g. climate adaptation and mitigation, densification, re-use, inclusivity
- Can analyse the interaction between environmental factors such as wind, water and the built environment
- Can utilise theories and methods in order to analyse and evaluate contemporary built environments and notions of 'compact cities'
- Can develop a proposal that integrates engineering techniques with conceptual and spatial design
- Can structure project management activities based on a well-formulated problem formulation

### Competencies:

- Can work with techniques for adapting to climate change in densified built environments that compile technical, spatial, social and aesthetic qualities into an integrated design solution
- Can evaluate existing situations and utilise innovative and contemporary sustainable engineering techniques in the transformation of the built environment
- Can evaluate and communicate the effects of urban transformation as environmentally and socially sustainable
- Can reflect on, plan and manage a study project in a PBL learning environment

Teaching: Problem-based project work in groups.

Examination: Individual oral examination based on the project report, internal grading, 7-point scale.

Assessment criteria: Stated in the Joint Programme Regulations.

## 1<sup>st</sup> Semester: Course Module 1 (Cities and Sustainability)

Title: **Climate and Hydrology of the Dense City (Klima og hydrologi i den tætte by)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Must have knowledge of causes, development, and effects of climate change from global to local scale
- Must have knowledge on aquatic and terrestrial ecology and ecosystems
- Must have knowledge on techniques for addressing climate adaptation
- Must have knowledge on urban water management practices

### Skills:

- Must be able to utilise analytical tools and methods concerning sustainable and infrastructural design
- Must be able to identify and address problems in relation to climate adaption and hydrological issues relevant to the design of the built environment
- Must be able to assess similarities and differences between rural and urban ecosystems
- Must be able to assess the impact of the built environment on urban climatology
- Must be able to measure quantify, and model urban transformation processes in relation to the built environment

### Competencies:

- Must have the competence to analyse, plan, and guide the sustainable transformation of a city
- Must be able to evaluate the quality of urban 'blue' and 'green' ecosystem structures
- Must have the competence to develop strategies for urban climate adaption

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, 7-point scale.

Assessment criteria: Stated in the Joint Programme Regulations.

**2<sup>nd</sup> Semester:** **Common Course Module (Urban, Energy and Environmental Planning)**

**Title:** **The Socio-Technical Context of Planning (Planlægningens socio-tekniske kontekst)**

**Objectives:** Students completing the module acquire the following:

Knowledge:

- Knowledge of the context dependency of urban, energy and environmental problems
- Knowledge of links between technological development and theories for analysis of planning and decision-making processes
- Knowledge of how to apply insights from socio-technical theory in agency, better policy designs, and sustainability transition

Skills:

- Can use the presented concepts and methods in a socio-technical approach in relation to analysis of real life cases of environment, energy and urban planning and policy creation/development
- Can use and develop socio-technical theoretical approaches, concepts and methods for the analysis of specific problems at an advanced level
- Can propose interventions based on socio-technical knowledge, and communicate knowledge derived from socio-technical theoretical approaches to both specialists and non-specialists

Competencies:

- Can critically and independently use and develop socio-technical approaches, concepts and methods of analysis in problem-based project work
- Can understand and act upon complex problems in planning and technology, based upon socio-technical analysis and informed delimitation
- Can reflect upon own practise with a starting point in socio-technical knowledge, and thereby continuously develop capacity for being a professional change agent

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **2<sup>nd</sup> Semester: Project Module (Urban Planning and Management)**

**Title:** **Power in Planning (Magt i planlægning)**

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Knowledge of planning processes and an understanding of their relation to politics and power in the field of urban planning
- Knowledge and understanding of relevant concepts of power in the field of urban planning
- Knowledge and understanding of one or more urban planning theories on an international academic level
- Knowledge and understanding of the role of the planner in managing power relations
- Knowledge of theories of science and research methods relevant for conducting research within the field of urban planning

### Skills:

- Can identify questions about power and politics in urban planning research, and apply theories to justify the relevance of these questions for planning practice
- Can design a research project and use relevant research methods in order to analyse power in the practices of planning
- Can independently and critically develop concepts and methods for analysis of power in the practices of planning
- Can analyse and evaluate a planning process, and critically assess power dynamics in the practices of planning
- Can communicate research-based knowledge and discuss professional and scientific problems with both colleagues and non-specialists

### Competencies:

- Can independently and critically manage planning processes that are influenced by power dynamics
- Can independently start and implement a planning process through interdisciplinary cooperation while assuming professional responsibility
- Can independently take the responsibility for own professional development and specialisation

**Teaching:** Problem-based project work in groups.

**Examination:** Individual oral examination on the basis of the project report, external grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## 2<sup>nd</sup> Semester: Course Module 1 (Urban Planning and Management)

Title: **The Deliberative Planner (Den refleksive planlægger)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Knowledge and understanding of the institutional context and power relations within which the planner is working in practice
- Knowledge and understanding of professional values, democratic legitimacy, and the roles of the planner in an international and local context
- Understanding of professional individual conduct, actions and ethical frames *in* and *for* practices of the planner
- Thorough knowledge of the deliberative practices of the planner in dealing with conflict, and in managing the planning process through various and changing situations and differences in planning goals, agents and resources

### Skills:

- Can identify central challenges in professional planning practice
- Can make use of relevant theories, concepts and methods to analyse the practice of planning and critically evaluate the need for the planner to intervene in different contexts
- Can identify the core challenges in designing and managing deliberative planning processes to deal with power dynamics, conflicts and different interests

### Competencies:

- Can design and engage with complex planning processes in order to manage conflicts and different interests
- Can reflect on and develop own professional ethics and procedures
- Can facilitate interdisciplinary collaboration and cooperation in a planning context and be able to reflect in action while assuming professional responsibility

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, pass/fail.

Assessment criteria: Stated in the Joint Programme Regulations.

## 2<sup>nd</sup> Semester: Course Module 2 (Urban Planning and Management)

Title: **Planning Theory (Planl gningsteori)**

Objectives: Students completing the module acquire the following:

### Knowledge:

- Knowledge of a broad spectrum of international planning theories
- Knowledge of the intellectual origins and value foundations of different planning theories
- Understanding of one or more planning theories on an international academic level
- Understanding of the difference between theories *in* and theories *of* planning
- Knowledge and understanding of the role(s) of planning in society
- Knowledge and understanding of the role(s) of the planner in society

### Skills:

- Can assess the relevance of different planning theories in different planning contexts
- Can on a scientific basis evaluate the strengths and weaknesses of different planning theories
- Can relate international planning theory to contemporary planning problems and the practices of planning
- Can communicate research-based planning theory, and discuss professional and scientific problems related to planning theory with professionals as well as non-professionals

### Competencies:

- Can independently and critically apply planning theory to work and development situations that are complex, unpredictable and require new solutions
- Can independently apply planning theory in subject specific and interdisciplinary cooperation
- Can independently take responsibility for own professional development and specialisation

Teaching: Lectures, workshops, seminars, assignments, etc.

Examination: Individual oral or written examination, internal grading, 7-point-scale.

Assessment criteria: Stated in the Joint Programme Regulations.

## **2<sup>nd</sup> Semester: Project Module (Sustainable Energy Planning and Management)**

**Title:** **Sustainable Energy Planning in an Institutional and Societal Perspective (Energiplanlægning i et institutionelt og samfundsmæssigt perspektiv)**

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Thorough knowledge and understanding of framework conditions, challenges and roles in relation to energy problems of society, including an ability to use tools and evaluation methods to analyse them
- On a scientific basis ability to understand and reflect on energy planning on a societal level as well as to identify problems in this context
- Thorough knowledge as to how the concrete economic, organizational and institutional context in different countries and cultures affect the energy situation as well as the technical and organisational possibilities of action within the energy field

### Skills:

- Can formulate and analyse proposals for strategies within energy planning, which are based on an analysis of the societal conditions
- Can understand, use and critically reflect on relevant quantitative as well as qualitative economic, sociological, environmental and/or engineering analysis methods and uncover the interests connected to these
- Can scientifically motivate, argue and communicate the general structure and methods of the project. Must also be able to relate critically to sources and use accurate source references
- Can communicate the result of the project work to selected target groups

### Competencies:

- Can structure and handle the complex combination of specific challenges related to energy planning on a societal level
- Can combine and compose the use of relevant theories, understandings, methods and analyses so that they form a synthesis towards the preparation of specific strategies and plans directed towards institutional and societal conditions and possibilities
- Can develop adequate theoretical approaches linked to specific problems/challenges and independently collect the relevant data and assess the quality and reliability of these data
- Can independently start and participate in interdisciplinary planning tasks and cooperation across societal levels, nationalities and cultures

**Teaching:** Problem-based project work in groups.

**Examination:** Individual oral examination based on the project report, external grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **2<sup>nd</sup> Semester: Course Module 1 (Sustainable Energy Planning and Management)**

**Title:** Sustainable Energy Policies (Bæredygtige energipolitikker)

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Thorough knowledge of international sustainable energy policies, including their origin and historical context
- Knowledge of theories on sustainable international energy policies
- Knowledge of the connection between international decision processes and sustainable national and/or international energy policies as well as the directly and indirectly involved actors
- Knowledge of the implementation and effect of sustainable international energy policies

### Skills:

- Can understand and reflect on the connection between context, policies, implementation and effects
- Can critically analyse sustainable energy-related problems in relation to national and international energy policies
- Can understand the interplay between institutions and sustainable energy policies
- Can understand and assess planning and the implementation of policies, including the connection between policies and institutions

### Competencies:

- Can independently start and participate in interdisciplinary tasks and cooperation on an organisation level
- Can independently take the responsibility for own professional development and specialisation

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, pass/fail.

**Assessment criteria:** Stated in the Joint Programme Regulations.



## **2<sup>nd</sup> Semester: Course Module 2 (Sustainable Energy Planning and Management)**

**Title:** Energy System Analysis 2 (Energisystemanalyse 2)

**Objectives:** Students completing the module, acquire the following:

### Knowledge:

- Thorough knowledge of technical and economic energy system analysis on a regional, national or international level, including a special focus on renewable energy and energy savings
- Knowledge of various types of energy system analysis models and their application
- Knowledge of technical, economic and environmental optimisation criteria in relation to energy planning and societal interests
- Knowledge of the connection between technical analyses, socio-economic consequences and public regulation

### Skills:

- Can analyse and assess consequences of the implementation of large quantities of renewable energy
- Can analyse the interplay between energy efficiency improvements (saving) and energy supply in a sustainability strategy
- Can analyse and assess energy systems from technical, economic and environmental criteria
- Can analyse and assess energy systems from a number of optimisation criteria, including possible conflicting interests
- Can assess applications for evaluation methods and tools, including critically assess results and conclusions on the basis of different methods and tools

### Competencies:

- Can prepare proposals for technical system design and combine it with the design of public regulation and strategies in energy planning
- Can independently start and participate in interdisciplinary tasks and cooperation on an organisation level
- Can independently take the responsibility for own professional development and specialisation

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, pass/fail.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## 2<sup>nd</sup> Semester: Project Module (Environmental Management and Sustainability Science)

Title: **Sustainability Management in a Societal and Institutional Perspective (Bæredygtighedsledelse i et samfundsmæssigt og institutionelt perspektiv)**

Objectives: Students completing the module, acquire the following:

### Knowledge:

- Have thorough knowledge and understanding of institutional and social framework conditions, actors and challenges for sustainability management

### Skills:

- Can analyse and understand the handling of environmental problems on a societal level, including the integration of environmental policies, instruments and institutional aspects
- Can identify, analyse and assess project-relevant sustainability problems and consequences in an overall perspective
- Can formulate and analyse proposals for strategies within the environmental field which are based on an analysis of the technical and institutional conditions
- Can understand, use analytically and critically reflect on relevant quantitative and qualitative economic, sociological, environmental and/or engineering methods
- Can independently collect data in relation to relevant problems and assess the quality and reliability of the used data
- Can explain the general structure and methods of the project. Must also be able to reflect critically to sources and use accurate source referencing
- Can use project-relevant theories of contexts to create policy design, plans and action for improved sustainability

### Competencies:

- Can structure and handle the complex challenges related to sustainability
- Can combine relevant theories, understandings, methods and analyses to form a synthesis towards the preparation of specific strategies and plans directed towards institutional and social framework conditions
- Can independently start and participate in interdisciplinary planning and engineering tasks.

Teaching: Problem-based project work in groups

Examination: Individual oral examination based on the project report. External grading, 7-point scale.

Assessment criteria: Stated in the Joint Programme Regulations.

## **2<sup>nd</sup> Semester: Course Module 1 (Environmental Management and Sustainability Science)**

**Title:** **Natural Resource Management (Forvaltning af naturressourcer)**

**Objectives:** Students completing the module acquire the following:

Knowledge:

- Knowledge of relevant national and international legislation for specific natural resources
- Understanding of measurement and indicator techniques for specific resource types
- Knowledge and understanding of rights, access and ownership models to natural resources (commons, leasing etc.)

Skills:

- Can describe and explain the technologies used to extract and use specific natural resources
- Can discuss possible innovations and their applicability depending on framework conditions
- Can describe existing natural resource management approaches that are applied to use, protect and/or restore specific natural resources
- Can explain principles of sustainable use of marine, terrestrial and other resources

Competencies:

- Can analyse interrelated market dynamics between different resources using calculation models
- Can assess sustainability of specific management and consumption practices
- Can compare problems and strategies used in management of different natural resources in different settings

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, pass/fail.

**Assessment criteria:** Stated in the Joint Programme Regulations.

**2<sup>nd</sup> Semester: Course Module 2 (Environmental Management and Sustainability Science, and Cities and Sustainability)**

**Title: Sustainability Assessment and Societal Decision Processes (Bæredygtighedsvurderinger og samfundsmæssige beslutningsprocesser)**

**Objectives:** Students completing the module, acquire the following:

**Knowledge:**

- Knowledge of different technical impact tools and methodologies applied for ex-ante sustainability assessment
- Knowledge and understanding about the socio-technical context in which ex-ante impact assessment is developed and used
- Knowledge and understanding of how impact assessment connects to societal decision-making on e.g. large infrastructures, technologies or spatial developments
- Can understand and reflect on decision-making theories

**Skills:**

- Can choose impact assessment methods and tools for ex-ante sustainability assessment
- Can integrate technical analyses of bio-physical and social variables in the assessments and decision-making processes
- Can analyse and assess theoretical and practical problems, and develop and assess solutions that favour sustainable development
- Can communicate results of assessments to both other peers and non-specialists

**Competencies:**

- Can handle complex assessment situations
- Can participate critically and reflexively in impact assessment to secure more sustainable planning and decision-making at societal level

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, 7-point scale

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **2<sup>nd</sup> Semester: Project Module (Cities and Sustainability)**

**Title:** **Designing Smarter Cities (Design af smarte byer)**

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Knowledge of the importance of contemporary infrastructures to the functionality of cities
- Understand of the technical factors shaping and forming the contemporary urban systems in their social context
- Knowledge of the adequate functional and technical solutions to sustainability challenges within the contemporary city

### Skills:

- Can apply the theories and methods relevant to the design and development of (selected) smarter urban systems and infrastructures
- Can evaluate the solutions presented in the field and assess their values seen in the light of urban design theories, methods and reference projects
- Can establish skills in analysing the infrastructural challenges of the contemporary city applying relevant technologies and methods
- Can independently collect data in relation to relevant problems and assess the quality and reliability of the used data
- Can explain the general structure and methods of the project
- Can reflect critically on sources and use accurate source referencing

### Competencies:

- Can combine relevant theories, concepts, methods and analyses to form a synthesis towards the preparation of specific strategies and plans directed towards institutional and social framework conditions
- Can create design proposals and concepts for smarter urban living and assess their implementation effects

**Teaching:** Problem-based project work in groups

**Examination:** Individual oral examination based on the project report, external grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

## **2<sup>nd</sup> Semester: Course Module 1 (Cities and Sustainability)**

**Title:** **Theories of the Network City and its Technologies (Teorier om netværksbyen og dens teknologier)**

**Objectives:** Students completing the module acquire the following:

### Knowledge:

- Must have knowledge about the technical forces shaping the network city and their societal consequences
- Must be able to understand the basic factors behind the creation of the network city and its technologies
- Must be able to develop knowledge about the network city and its technologies as a 'large technical system'

### Skills:

- Must be able to apply the relevant scientific theories and methods related to an analysis of the technological infrastructure systems of the network city
- Must be able to evaluate proposals for intervention and design of the network city in light of state-of-the-art theories

### Competencies:

- Must acquire competencies in analysing the network city on a theoretical and methodologically reflective level
- Must acquire competencies in assessing technical solutions to traffic and mobility challenges of the network city

**Teaching:** Lectures, workshops, seminars, assignments, etc.

**Examination:** Individual oral or written examination, internal grading, 7-point scale.

**Assessment criteria:** Stated in the Joint Programme Regulations.

### 3<sup>rd</sup> Semester: Common Project Module (Urban, Energy and Environmental Planning)

Title: **Professional Development (Faglig udvikling)**

Contents At the 3<sup>rd</sup> semester the student can choose between four options:

**Option 1: Project Semester – with or without Integrated Internship**

The students can choose to do a traditional project semester typically founded on subject knowledge from the 1<sup>st</sup> and 2<sup>nd</sup> semesters and/or prepare for the subject about which the student wish to write a thesis. The semester comprises the preparation of a project report or a scientific article.

The student can choose to integrate an internship into the project module. The internship is typically of three months' duration and has to be approved in advance by the semester coordinator on behalf of the Study Board of Planning, Geography and Surveying.

Objectives: Students completing the project module acquire the following:

Knowledge:

- Must within the chosen field have knowledge based on the highest international research
- Must be able to understand and relate critically to the knowledge of the field and be able to identify either scientific problems or practical problems in a given complex context.
- Must have knowledge of basic project management principles a) applied at the internship site (for internship projects) or b) applied in organisations working in the field in general (for projects without internships)

Skills:

- Can master the scientific methods and tools of the field as well as general skills in relation to the solution of the chosen problem
- Can assess and choose among the scientific methods, tools and general skills of the field and draw up new models of analysis and solution
- Can synthesize the main issues in relation to a specific field concerning interventions and analyses, and outline recommendations for solutions or improvements
- Can discuss professional and scientific problems with both colleagues and non-specialists
- Can reflect on own learning

For internship projects the following furthermore apply:

- Can compare project management principles at the internship site with approaches to project management applied in university project work
- Can give an account of experience within the practical work processes and methods gained in the specific context of the internship and is able to perform a critical evaluation of the applied work processes
- Can reflect on the significance of the interventions or analyses involved in during the internship, including purpose, strategic and/or political implications, and future use
- Can comprehend the organisational framework conditions under which the internship and the specific interventions or analyses take place

Competencies:

- Can manage work and development situations which are complex, unpredictable and require new solution models
- Can independently start and carry through professional and interdisciplinary cooperation and take a professional responsibility
- Can independently take responsibility for own professional development and specialisation

Teaching: Problem-based project work, possibly with internship integrated.

Examination: Individual oral examination based on the project report or article. Internal grading, 7-point scale.

**Option 2: Another UEEP 1st semester**

A student who has followed one 1<sup>st</sup> semester under the Urban, Energy and Environmental Planning master's programme may choose to follow another 1<sup>st</sup> semester under UEEP or Geography. In that case the student follows the course and project modules at this semester and acquires the knowledge, skills and competencies which are stated in the curriculum for the concerning semester. A 5 ECTS assignment must be prepared as replacement for the course module "Theories of Science and Research Designs" to meet the 30 ECTS semester load.

**Option 3: International or National Credit**

After previous approval by the Study Board, the 3<sup>rd</sup> semester may be transferred to another educational institution. Previous approval (pre-credit) may be expected if these studies can give the student appropriate knowledge, skills and competencies.

**Option 4: Extended Master's Thesis**

Students may choose to combine the 3<sup>rd</sup> and 4<sup>th</sup> semesters into an extended master's thesis (60 ECTS). Extended theses are especially advised when working on project topics, where an extraordinary great generation of data is necessary. Theses (including extended theses) have to be approved in advance by the Study Board of Planning, Geography and Surveying, and the student has to fulfil the knowledge, skills and competencies as indicated for master's theses. See description of 4<sup>th</sup> semester.



#### **4<sup>th</sup> Semester: Common Project Module (Urban, Energy and Environmental Planning)**

Title: **Master's Thesis (Kandidatspeciale)**

Recommended academic prerequisites:

Passed the three first semesters of the Programme in Urban, Energy and Environmental Planning

Objectives: Students completing the module acquire the following:

Knowledge:

- Thorough knowledge of relevant theories and methods in relation to the chosen problem and can reflect on them
- Can describe the used theories so that the special characteristics of the theories are brought to light and in this way document understanding of the possibilities and limitations of the used theories within the concerned field of problems
- Have knowledge of the scientific-theoretical and methodical embeddedness of the used theories and can reflect on them
- Have thorough knowledge of the research embeddedness of the chosen problem, including knowledge of the most important national and international research in the field

Skills:

- Can independently plan and carry through a project at a high professional level
- Can give an account of possible methods for solution of the problem formulation of the project, and describe and assess the suitability of the chosen method, including an account of chosen limitations and their importance to the results
- Can give an account of the relevance to the education of the chosen problem, including a precise account of the core of the problem and the professional context
- Can analyse and describe the chosen problem by using relevant concepts, theories and empirical investigations
- Can analyse and assess the results of empirical investigations, whether it is the student's own investigations or those of others, including an assessment of the importance of the investigation methods to the validity of the results
- Can point out relevant future strategies, possibilities of change and/or solution proposals
- Can impart knowledge of the problem to both professionals and non-professionals

Competencies:

- Can form a synthesis between the professional problem, theoretical and empirical investigations and make a critical assessment of the synthesis formed and the other results of the project work
- Can independently, on the basis of the acquired problem, be part of interdisciplinary discussions and development work
- Can independently acquire the newest knowledge in the field and are on this background capable of continuously developing the professional skills and competencies

Teaching: Problem-based project work alone or in groups.

Examination: Individual oral examination on the basis of the thesis, external grading, 7-point scale.

Assessment criteria: Stated in the Joint Programme Regulations.

## Chapter 4: Entry into Force, Interim Provisions and Revision

This curriculum is approved by the Dean of The Technical Faculty of IT and Design and enters into force as of September 1, 2017.

Students who wish to complete their studies under the previous curriculum from 2010 must conclude their education by the summer examination period 2018 at the latest, since examinations under the previous curriculum are not offered after this time.

## Chapter 5: Other Provisions

### 5.1 Rules concerning written work, including the Master's thesis

In the assessment of all written work, regardless of the language it is written in, weight is also given to the student's spelling and formulation ability, in addition to the academic content. Orthographic and grammatical correctness as well as stylistic proficiency are taken as a basis for the evaluation of language performance. Language performance must always be included as an independent dimension of the total evaluation. However, no examination can be assessed as 'Pass' on the basis of good language performance alone; similarly, an examination normally cannot be assessed as 'Fail' on the basis of poor language performance alone.

The Board of Studies can grant exemption from this in special cases (e.g., dyslexia or a native language other than Danish).

The Master's thesis must include an English summary.<sup>1</sup> If the project is written in English, the summary must be in Danish.<sup>2</sup> The summary must be at least 1 page and not more than 2 pages. The summary is included in the evaluation of the project as a whole.

### 5.2 Rules concerning credit transfer (*merit*), including the possibility for choice of modules that are part of another programme at a university in Denmark or abroad

The Board of Studies can approve successfully completed (passed) programme elements from other Master's programmes in lieu of programme elements in this programme (credit transfer). The Board of Studies can also approve successfully completed (passed) programme elements from another Danish programme or a programme outside of Denmark at the same level in lieu of programme elements within this curriculum. Decisions on credit transfer are made by the Board of Studies based on an academic assessment. See the Joint Programme Regulations for the rules on credit transfer.

### 5.3 Rules for examinations

The rules for examinations are stated in the Examination Policies and Procedures published by The Technical Faculty of IT and Design on their website.

### 5.4 Exemption

In exceptional circumstances, the Board of Studies study can grant exemption from those parts of the curriculum that are not stipulated by law or ministerial order. Exemption regarding an examination applies to the immediate examination.

### 5.5 Rules and requirements for the reading of texts

It is assumed that the student can read academic texts in his or her native language as well as in English and use reference works etc. in other European languages. At programmes taught in

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<sup>1</sup> Or another foreign language (upon approval from the Board of Studies).

<sup>2</sup> The Board of Studies can grant exemption from this.

Danish, it is assumed that the student can read academic texts in modern Danish, Norwegian, Swedish and English.

### **5.6 Additional information**

The current version of the curriculum is published on the Board of Studies' website, including more detailed information about the programme, including exams.